# C L A I M S

1. Method of assessing pore fluid pressure behaviour in a region of interest in a subsurface formation below an earth surface, wherein a stress value representative of formation stress is determined in a measurement region of the subsurface formation being located displaced from the region of interest, and the stress value is used to detect presence of non-hydrostatic pore fluid pressure in the region of interest.

2. The method of claim 1, wherein detecting presence of non-hydrostatic fluid pressure comprises detecting a pressure boundary wherein the pore fluid pressure changes from hydrostatic to non-hydrostatic.

3. The method of claim 1 or 2, wherein detecting presence of non-hydrostatic fluid pressure comprises detecting a precursor zone wherein the pore fluid pressure is hydrostatically determined and a stress gradient increases.

4. The method of claim 1 or 2, whereby the fluid pressure in the measurement region is hydrostatic.

5. The method of any one of claims 1 to 4, wherein the measurement region of the subsurface formation is located less deep as seen from the earth surface than the region of interest.

6. The method of any one of claims 1 to 5, wherein using the stress value for detecting non-hydrostatic pore fluid pressure in the region of interest includes inferring an effective stress value representative of the difference between the formation stress in the measurement region

and a value of pore fluid pressure in the measurement region.

7. The method of any one of claims 1 to 6, wherein detecting non-hydrostatic pore fluid pressure in the region of interest includes using a geo-mechanical model of the subsurface formation.

8. The method of any one of the previous claims, wherein determining the stress value includes determining a principal stress value representative of the horizontal formation stress in the measurement region.

9. The method of any one of the previous claims, wherein determining the stress value includes performing a geophysical measurement, such as a seismic measurement or a sonic measurement, to obtain geophysical data, and processing the geophysical data to obtain the stress value.

10. The method of any one of the previous claims, wherein two or more stress values are determined, each at a different depth in the measurement region.

11. The method of claim 10, wherein effective stress values are inferred for each of the stress values, which effective stress values are representative of the difference between the formation stress at the corresponding depths in the measurement region and the value of the pore fluid pressure at substantially the same depth in the measurement region.

12. The method of claim 11, wherein a variation of the two or more effective stress values as a function of their depths is inferred, and compared to a nominal value.

13. The method of any one of the previous claims, wherein prior to assessing pore fluid pressure behaviour in the region of interest:

- a drill bit is provided on a lower end of a drill string; and
- the lower end of the drill string is lowered in a bore hole in the subsurface formation,

and wherein during assessing the pore fluid pressure behaviour in the region of interest:

- the drill bit is operated to deepen the hole.

14. System for assessing pore fluid pressure behaviour in a region of interest in a subsurface formation below an earth surface, the system comprising:

- a measurement arrangement for producing a signal representing a stress value representative of the formation stress in a measurement region of the subsurface formation; and
- a signal processing device arranged to receive the signal and utilize the signal to detect presence of non-hydrostatic pore fluid pressure in the region of interest, which region of interest is located displaced from the measurement region.

15. The system of claim 14, wherein the measurement system includes at least a measurement-while-drilling device that is installable on a drill pipe for lowering into a bore hole such that the measurement-while-drilling device can reach or approach the measurement region.